

There is no well known use of such band filters in the beer brewing industry. If the filters of Molzahn and Kerr find the occasional use in breweries it would be restricted to effluent filtration. Filter 6 on the chart is a schematic representation of the commonly used filter of this type in industry as a whole and they find practically no use as liquid clarification devices. Their application is almost entirely restricted to solids recovery.

They are fundamentally unsuited for process liquid clarification duties on an industrial scale.

The use of this genre of filter would be a total failure for replacing the above recited list of separation operations in the conventional beer brewing process.

The insight that the filter of Miller could be used with significant benefit in the beer brewing industry exhibits a high degree of inventive and innovative capability.

Apart from the use of the word "beverages" there is not even a hint that the filter specified in GB 2280857 could be used in the manner described in the present invention.

The examiner claims that heating and cooling of the mash is notoriously well known. This is true but with the central distinction that according to Fig.1 of the prior art brewing process the heating takes place at stage (1) and the cooling takes place at stage (8).

According to the present invention heating and cooling and all the rest stages 2-7 depicted in Fig. 1 are carried out with a single mash vessel and filtering device depicted in Fig. 2. This would not be a practicable proposition with any of the remaining known filter designs designated in the "family tree" at 1-6 and 7/8.

The creative insight is the recognition that this is a possibility with the filter of GB2280857 (202) combined with the mashing aggregate depicted at (201).

The difference between the prior art depicted on Fig. 1 and the subject matter of the present invention would not have been obvious to a person having ordinary skills in the brewing and industrial filtration sectors.

The objective of the USP 6207208 (Irwin) is to remove a particular molecular species from process liquids in brewing processes including wort and beer by a well know treatment using an adsorptive substance.

This in no way touches Claim 5 of the present invention.

Here the objective is to maintain clarity of the wort and beer throughout the brewing process and in particular to maintain the clarity and simultaneously to stabilize the beer in the fermenter during the fermentation process by the addition of well known powdered substances.

I disagree with the examiner that the claims are indefinite on semantic grounds. However, I propose the following amendments to the claims:

1. Line 4, Claim 1: "comprising" replaces ", thereby characterised, that"
2. Line 2, Claim 2: "whereby the" replaces "thereby characterised, that"
3. Line 1, Claim 3: "whereby" replaces "thereby characterised, that"
4. Line 1, Claim 4: "whereby" replaces "thereby characterised, that"
5. Line 1, Claim 5: "whereby" replaces "thereby characterised, that"
6. Line 1, Claim 6: "whereby" replaces "thereby characterised, that"
7. Line 2, Claim 7: "comprising" replaces ", thereby characterised, that"

I cannot think of a better expression than "the clarified wort is dosed with adsorbents"

The word "dosing" cannot be substituted for "is dosed"

To understand the term "the movable dependent edges" you must have a knowledge of the wide range of filter designs of the genre of filter involved in the present invention.

I haven't the space to describe this.

Perhaps the colour-marked passages in the enclosed annexes marked 1 and 2 may help. This expression has been accepted by both the UK and Australian Patent Offices.

The term "lid-like" is linked to the explanation given immediately above. It could be described as a cover looking like a lid. This includes non-movable covers which are also covered by GB2280857.

Regarding the passage of the examiner's report referring to "particle size" he is right to say that it is obvious that the extraction is improved the smaller the particle size of the malt. What he apparently does not realise is that processing grist of the order of 20-100 microns would not be a practicable possibility using filters of the prior art depicted at 103, Fig. 1. For this reason the wort sent to the fermentation in the prior art brewing is seldom if ever clarified to the degree claimed by the present invention which is a central aspect of the present innovation.

The rejection of claim 6 under USC 103 as being unpatentable over Hardwick (Handbook of Brewing, page 339) is not supported by paragraph C "Pressure Fermentation".

Here it is suggested that CO2 pressure should be applied to achieve fermenting pressures of up to 2 bar to influence beer characteristics.

In the present invention the goal is completely diverse. Here high pressures are not necessarily aimed at. Instrumentation 223, 220 and 218 to control temperature, pressure and CO2 evolution is during fermentation to obtain a preconceived optimal RATE OF FERMENTATION and a final *consistent* beer quality.

To the best of my knowledge there are no publications that in any way even hint at this combination for control of the fermentation.

I believe that the above dissertation will be sufficient to place this application in the condition of allowance regarding MERIT.

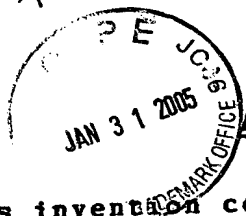
Miller



Enclosed: Annex 1
Annex 2
Chart "family tree"

uspareponse2005

2280857



DESCRIPTION

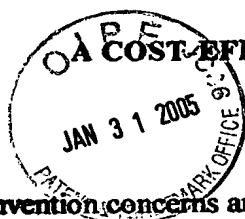
BELT

FILTER

This invention concerns a genre of liquid filters that can be described as a travelling web, flat-bed filter apparatus for filtering contaminated fluid from a contaminant supply and delivering filtered liquid to a filtered liquid outlet, the assembly consisting of

- a section of web of filter medium lying on and supported by a perforated support plate;
- cover means with dependent rim sections extending downwards, the lower surfaces of which make direct sealing engagement with peripheral portions of the said section of web of filter medium, thus forming an upper contaminant chamber;
- a receptacle for filtered liquid located beneath the support plate having upstanding rim portions, the upper surfaces of which make sealing engagement with the lower peripheral portions of the section of web of filter medium forming a lower filtrate chamber;
- means for engaging and disengaging the said upper and lower surfaces of the said upper cover and lower receptacle, thus sealing and releasing respectively the said portions of the filter web;
- a pressure pump located in a conduit in fluid connection with the means of the contaminant supply and the interior of the upper contaminant chamber;
- a suction/vacuum pump located directly or indirectly in or to a conduit in fluid communication with the interior of the lower filtrate chamber and a filtrate receiver;
- each of the said pumps alone providing the means to transport both contaminant and filtered liquid and thereby create a pressure difference between the contaminant and filtrate chamber;
- conduit means in fluid communication with a source of compressed gas and/or the surrounding atmosphere and the interior of the upper contaminant chamber;

Annex 2



A COST-EFFECTIVE BEER BREWING PROCESS

The invention concerns an innovative process for brewing beer. The goal of the invention is to disclose a process that reduces considerably the present-day product losses and the resulting serious ecological problems with their associated costs.

Recent publications indicate that the world-wide product losses in beer brewing including processed raw and intermediate materials and final product lie in the region of 20-30%. The main sources of loss occur in the mash production and filtration followed by beer clarification operations after fermentation. Alone in the mashing process losses of up to 20% are caused by incomplete breakdown of the starch and polysaccharides. Up to 10% of the available fermentable sugars from mashing is lost in the mash filtration operation because of inefficient recovery of the fermentable sugars contained in the thick beds of the coarse mashing residues remaining at the end of the filtration operation. Beer losses of the fermented wort of up to 10% are incurred in the average brewery according to the particular type of brewing process, for instance, whether bottom or top fermentation is practiced or whether conditioning substances for clarification after fermentation are used or not. It is commonly acknowledged that for every litre of beer produced 5-10 litres of biologically highly contaminated effluent are generated.

The Invention

Fig.1 is a flow-sheet of a conventional brewery. The clarification stages 103, 105, 107, 109, 110, 112, 113, 114, 116, 117 causing a large part of the product loss and effluent problem are replaced in the present invention by the stages 202, 204 illustrated in Fig.2 the apparatus of which complies with the genre of filtration equipment disclosed in GB2280857. These are band filters with a filter chamber through which a filter band is intermittently transportable over a support surface that divides the filter chamber into a lower filtrate chamber and an upper turbid liquid chamber, whereby the turbid liquid chamber has a lid-like form/and the filter band during the operation when a pressure differential in the filter chamber develops is sealed between the movable dependent edges of the turbid liquid chamber and the filtrate chamber. The advantage of the further developed version of this band filter is that suspensions of finely divided solids can be

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